

REMARKS

This Amendment is in response to the Office Action mailed January 15, 2004. In that Office Action, the Examiner noted that the reply filed on 12/24/2003 was not fully responsive to the prior Office Action mailed 10/03/2003. The Examiner invited applicant to supply the noted omissions and corrections. This Revised Amendment is intended to replace the reply filed on 12/24/2003. The above listing of claims is presented relative to the claims as originally filed. All the responses previously filed on 12/24/2003 are repeated with appropriate corrections and additions to address the Examiner's concerns expressed in the Office Action mailed 01/15/2004.

This Amendment is in response to the Office Action mailed 10/03/2003. In the Office Action, the Examiner objected to the specification and rejected claims 1-96 under 35 U.S.C. § 112. Reconsideration in light of the amendments and remarks made herein is respectfully requested.

Claims 1-96 remain in this application.

Response to Amendment

2. The Examiner found the reply filed on 12/24/2003 not fully responsive to the prior Office Action because of the following omission(s) or matter(s):

a) Page numbers were missing or duplicated in the numbering of the pages in the amendment. The material of the reply filed on 12/24/2003 is represented with corrected page numbering.

b) The Examiner considers applicant not to have responded to the objection to new matter of paragraph 4 of paper #5. Applicant has added a response to the new matter rejection in the revised reply which follows.

Applicant respectfully requests that the Examiner consider this reply on the merits. The following replies replace the replies as filed on 12/24/2003.

Claim Objections

2. The Examiner points out the numbering of claims is not in accordance with 37 CFR 1.126 which requires the original number of the claims to be preserved throughout the prosecution. Misnumbered claims 20 (which is now renumbered as claim 22) to 95 have been renumbered as claims 22-96 by Applicant.

Specification

3. The Examiner contends the title of the invention is not descriptive. Applicant has amended the title to "System and Method for Modeling a Digitally Simulated Camera and Lens."

Response to Amendment

4. The Examiner considers the amendments to the specification and to figure 6a filed on 1/24/2002 not to be supported by the original disclosure.

In reviewing the amendments to the specification and to figure 6a filed on 1/24/2002, applicant has observed that some of the amendments are in error and that the amendments to figure 6a may be difficult to read. To correct these errors, to improve the legibility of the proposed changes to figure 6a, and for the convenience of the Examiner, applicant is submitting amendments to the specification and figure 6a that completely replace the amendments to the specification and to figure 6a filed on 1/24/2002 as part of this Amendment. The amendments are marked as changes over the specification as originally filed.

An amendment to correct an obvious error does not constitute new matter where one skilled in the art would not only recognize the existence of error in the specification, but also the appropriate correction. *In re Oda*, 443 F.2d 1200, 170 USPQ 268 (CCPA 1971). MPEP § 2163.07.

In the paragraph that begins on page 17, line 29, the formula for calculating true focal length (TFL) is corrected from:

$$\text{TFL} = \text{FL}^2/(\text{Focus}-\text{FL})$$

to

$$\text{TFL} = \text{FL} + \text{FL}^2/(\text{Focus}-\text{FL})$$

Applicant respectfully submits that the formula given in the original disclosure is an obvious error and that one of ordinary skill in the art would recognize the existence of the error in the specification and the correction. The American Cinematographer Manual, fifth edition, copyright 1980, on page 237 shows the formula given in the original disclosure as the formula for lens displacement when focused closer than infinity. One of ordinary skill in the art would recognize that the lens displacement has to be added to the focal length at infinity to obtain the true focal length of a lens focused closer than infinity. One of ordinary skill in the art would also recognize that TFL is equal to FL when Focus is infinity. When Focus is infinite, $\text{FL}^2/(\text{Focus}-\text{FL})$ is zero. Thus the addition of FL to obtain TFL is obvious. This is supported by the example calculations shown in figures 8d, 9a, 10a, 11a, 12b, 13a, and 14a. Block 635 of figure 6a is similarly corrected.

In the paragraph that begins on page 18, line 13, --for example look-up table 637-- is added following "A lookup table". The look-up table of figure 6a was part of the original disclosure. Applicant respectfully submits that the addition of a reference to the table does not add new matter.

In the paragraph that begins on page 20, line 1, the formulas for calculating fields of view are corrected from:

$$V_{fov} = 2 * (\text{atan}(A_p/A_r)/2, FL))$$

$$H_{fov} = 2 * (\text{atan}(A_p/2, FL))$$

to

$$V_{fov} = 2 \tan^{-1} ((A_p/A_r) / (2 * TFL))$$

$$H_{fov} = 2 \tan^{-1} (A_p / (2 * TFL))$$

The specifications as filed, page 14, lines 7-8, states, "Correct horizontal and vertical angles of the field of view are determined from the true focal length." Applicant respectfully submits that the correction of "FL" to --TFL-- to the equations for V_{fov} and H_{fov} merely reflect what was disclosed in the specification as filed and no new matter is added. The formula was originally expressed using an arc tangent function, atan, that takes the lengths of two legs of a triangles as arguments as found in certain computer programming languages. The formula has been restated using the convention mathematical formula for the arc tangent as a function of the ratio of two legs of a triangles. See American Cinematographer Manual, page 241. Two unnumbered blocks of figure 6a are similarly corrected.

Applicant now deletes the paragraph that begins on page 20, line 15, rather than amending the paragraph. Therefore no new matter is added. The formula for Clip Pos is similarly deleted from block 650 of figure 6a.

In the paragraph that begins on page 21, line 1, the formula for calculating marker position is deleted. Therefore no new matter is added.

Rejection Under 35 U.S.C. § 112

6. Regarding items 6-7 of the Office Action, claims 1-96 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention and in such a way as to being unable to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention.

Unfortunately, the Examiner incorrectly interpreted the phrase "camera model". As described in the Specification, the camera model in the specification refers to a set of parameters that may be used to simulate the operation of the camera (see Specification, page 12, lines 5-10). Some exemplary parameters that are used to simulate a digital camera include camera orientation data (e.g., XYZ translational position), lens attributes (e.g., focal length, desired circle of confusion, focus setting, f-stop, infinity setting, cut off setting), film format (e.g., aperture-size, aspect ratio) and inserted reference objects (e.g., clips, charts and visual aids) (see Specification, page 13, lines 4-19)

The model of the camera and lens is generated based on the input camera and lens characteristics. Then the image in the field of view of the modeled camera and lens is generated (see Specification, page 15, lines 18-25).

The Office Action stated that "most of the 'model' is directed at lens models and not camera models. Applicant respectfully disagrees. The camera parameters such as XYZ translation, lens attributes, film format are all directly related to a camera model. Since a camera includes a lens, a model for the lens is also part of a model for the camera. This is especially true when the lens parameters as described are only applicable in a camera context (e.g., focus setting, f-stop, infinity setting).

The Office Action further stated that "there is no teaching of a digital camera, as apparently recited in claims 51-96" (Office Action, page 3, last sentence). However, claims 51-96 recite "hand held camera and lens calculation device" (as in claims 51-58), "camera and lens parameter(s)" (claims 59-63), "digitally simulated camera and lens" (claims 64-77), "simulates digital camera and lens" (claims 78-92), "digital model of the first camera and lens" (claims 93-95). These claims do not recite a digital camera per se.

Apparently, the Examiner construes the "digital camera" as a physical digital camera. However, the claimed invention is about a digitally simulated camera and lens. The characteristics of the camera and lens may then be used in conjunction with other 3D software package to generate computer images (see Specification, page 4, lines 19-26).

Since claims 1-96 have ample support in the Specification, Applicant respectfully requests that the Examiner withdraw the rejection of claims 1-96 under 35 U.S.C. § 112, first paragraph.

9. Regarding items 9-10 of the Office Action, claims 1-50 and 65-96 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being incomplete for omitting essential steps, such omission amounting to a gap between the steps and claims 51-59 as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections.

As discussed above, the camera model herein refers to the camera and lens parameters. The camera is *digitally simulated* in that the camera parameters are used to generate graphic images by computer. [Emphasis added]

Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claims 1-59 and 65-96 under 35 U.S.C. § 112, second paragraph.

Claim Interpretation

11. Regarding items 11-15 of the Office Action, the Examiner states that "the claims are difficult to interpret in view of the lack of teaching of the 'camera model' and its implementation (Office Action, page 5, paragraph 12). However, as discussed above, the claimed invention is a digitally simulated camera. The word "camera model" refers to a set of camera parameters that are used to input to a 3D graphic program to generate 3D images.

The Examiner further states that "this claim reads on using a camera in 'manual setting', for example, where the film ASA is set, then the aperture is set, and then the shutter speed is set" (Office Action, page 5, paragraph 13). Again, apparently the Examiner interpreted the claims in terms of a physical digital camera, not a digitally simulated camera with camera parameters.

Rejection Under 35 U.S.C. § 102

19. Claims 1-96 were rejected under 35 U.S.C. § 102(b) as being anticipated by Subbarao (US Patent 4,965,840) ("Subbarao") or Wheeler et al. (US Patent 5,323,204) ("Wheeler"). Applicant respectfully traverses the rejection and contends that a *prima facie* case of anticipation has not been established.

To anticipate a claim, the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Vergegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the...claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989).

Subbarao discloses a method and apparatus for determining the distances between surface-patches of a three-dimensional spatial scene and a camera system. The camera system includes an image forming system, which is a lens system characterized by at least three camera parameters (Subbarao, col. 15, lines 63-65). After image acquisition, the image processing computer processes the digitalized image intensity matrix according to the image processing methods (Subbarao, col. 16, lines 19-21).

Wheeler discloses an automatic optimization of photographic exposure parameters for non-standard display sizes and/or different focal length photographing modes through determination and utilization of extra system speed. The system can be utilized in any one of a wide variety of photographic cameras (Wheeler, col. 14, lines 61-64).

Upon review, neither Subbarao nor Wheeler discloses explicitly or inherently adjusting camera and lens parameters in response to adjusting of another camera and lens parameters. Accordingly, Applicant respectfully requests that the rejection of claims 1-96 under 35 U.S.C. § 102(b) be withdrawn.

20. Claims 1-34 were rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Potmesil et al. (*Synthetic Image Generation with a Lens and Aperture Camera Model*, ACM Trans. Graphics; pp.85-108; April 1982) ("Potmesil"). Applicant respectfully traverses the rejection and contend that the Examiner has not met the burden of establishing a *prima facie* case of anticipation.

In contrast to the rejection, Potmesil does not disclose explicitly or inherently adjusting camera and lens parameters in response to adjusting of another camera and lens parameters. Instead, Potmesil disclose synthetic image generation with a lens and aperture camera model. A more complex camera model, although computationally more expensive, provides the means for

generating more realistic synthetic images closely approximating a scene imaged by an actual camera (Potmesil, page 86, lines 1-4).

Accordingly, Applicant respectfully requests that the of claims 1-34 under 35 U.S.C. § 102(b) be withdrawn.

21. Claims 1-34 were rejected under 35 U.S.C. § 102(e) as being anticipated by Rioux (US Patent 6,268,863) ("Rioux") or Kolb et al. (US Patent 6,028,606) ("Kolb"). Applicant respectfully traverses the rejection and contends that a *prima facie* case of anticipation has not been established.

Rioux discloses a method of simulating a photographic camera. A method of simulating the functionality of a photographic camera having a lens, an imaging plane and parameter effecting imaging (Rioux, col. 3, lines 13-16).

Kolb discloses a camera simulation system. A three dimensional radiant scene is stored in a memory of the computer system by a standard technique. (Kolb, col. 3, lines 41-44). A procedure which transforms by processor means the radiant scene data into a two-dimensional image also stored by the computer in an array of pixels and available for viewing by a standard technique (Kolb, col. 3, lines 44-46).

Neither Rioux nor Kolb discloses implicitly or inherently adjusting camera and lens parameters in response to adjusting of another camera and lens parameters.

Accordingly, Applicant respectfully requests that the rejection of claims 1-34 under 35 U.S.C. § 102(e) be withdrawn.

22. Claims 35-42 and 51-96 were rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Wheeler (US Patent 5,406,348) ("Wheeler"). Applicant respectfully traverses the rejection and contend that the Examiner has not met the burden of establishing a *prima facie* case of anticipation.

Wheeler discloses camera control/autofocusing system. A camera system incorporating an autofocus system of simple and inexpensive design that provides improved photospace coverage (Wheeler, col. 2, lines 34-36). The autofocus system utilizes both a measurement of the intensity level of ambient light and a determination of whether the ambient light is natural or artificial to set lens focus position, aperture opening and flash (Wheeler, col. 36-40).

Wheeler does not disclose, explicitly or inherently, generating markers indicative of optical characteristics, generating an image reflective of objects, and generating markers relative to the image.

Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claims 35-42 and 51-96 under 35 U.S.C. § 102(b).

23. Claims 35-42 and 51-96 were rejected under 35 U.S.C. § 102(e) as being clearly anticipated by Doron (US Patent 6,563,543) ("Doron"). Applicant respectfully traverses the rejection and contends that a *prima facie* case of anticipation was not established.

Doron does not disclose, explicitly or inherently, generating markers indicative of optical characteristics, generating an image reflective of objects, and generating markers relative to the image. Instead, Doron discloses a digital camera and method of using same. The camera includes an adjustable aperture, a lens/shutter arrangement and a motor for acting on the lens/shutter arrangement (Doron, col. 2, lines 14-17). The camera powers up in the fixed focus mode and to elect auto focus, the photographer moves a toggle switch, from a neutral position to a position diagrammatically as AF thereby setting the processor to the auto-focus mode (Doron, col. 4, lines 26-31).

Accordingly, Applicant respectfully requests that the rejection of claims 35-42 and 51-96 under 35 U.S.C. § 102(e) be withdrawn.

24. Claims 43-47 were rejected under 35 U.S.C. § 102(b) as being anticipated by Humphrey (US Patent 4,199,816) ("Humphrey") or Iwane (US Patent 5,349,433) ("Iwane"). Applicant respectfully traverses the rejection and contend that the Examiner has not met the burden of establishing a *prima facie* case of anticipation.

Humphrey discloses optical calibration apparatus and procedure. An optical instrument such as a lens meter or ophthalmometer is provided with a light source, a light detector and an optical train of assembled optical elements for passing light from the light source to the detector (Humphrey, col. 2, lines 37-41). A fixed calibration computer is substituted for each instrument's dedicated computer, is suitable for calibrating any optical instrument which makes use of a dedicated computer to manipulate internal constants in order to provide intelligible measurements to the user (Humphrey, col. 7, lines 21-25).

Iwane discloses an automatic lensmeter. The lensmeter comprises a measurement system including an optical system for detecting refractive powers of a lens and eccentricity (Iwane, col. 2, lines 24-28).

Neither Humphrey nor Iwane discloses explicitly or inherently the limitation of generating reference charts, generating image reflective of objects, and generating reference charts relative to the image.

Accordingly, Applicant respectfully requests that the rejection of claims 43-47 under 35 U.S.C. § 102(b) be withdrawn.

25. Claims 48-50 were rejected under 35 U.S.C. § 102(b) as being anticipated by Aloni et al (US Patent 5,586,058) ("Aloni") or Rushmeier et al. (*Comparing Real and Synthetic Images: Some Ideas About Metrics*, 1995) ("Rushmeier"). Applicant respectfully traverses the rejection and contends that a *prima facie* case of anticipation has not been established.

Aloni discloses apparatus and method for inspection of a patterned object by comparison thereof to a reference. An improved system for inspection of and detection of defects in objects

such as reticles, photomasks, semiconductor wafers, flat panel displays and other patterned objects (Aloni, col. 2, lines 35-38).

Rushmeier discloses comparing real and synthetic images. Numerical techniques are developed for comparing real and synthetic luminance images (Rushmeier, Abstract, first sentence).

Neither Aloni nor Rushmeier discloses explicitly or inherently generating a digital model of the first camera and lens using the camera and lens characteristic input and generating a second image in the field of view of the modeled camera and lens.

Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claims 48-50 under 35 U.S.C. § 102(b).

Conclusion

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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Attachments

